R18/R15

ANURAG Engineering College
(An Autonomous Institution)
IV B.Tech I Semester Supplementary Examinations, April – 2024
POWER SYSTEM OPERATION AND CONTROL

Time: 3 Hours **Max. Marks: 75**

Section – A (Short Answer type questions) (25 Marks)
Answer All Questions

		Course Outcome	B.T Level	Marks
1.	What are inequality constraints?	CO1	L1	2M
2.	Define the incremental fuel cost and heat rate curve.	CO1	L1	3M
3.	What are conventional hydro-electric plants?	CO2	L1	2M
4.	In the optimal scheduling problem of a hydro – thermal system, which variables are considered as control variables?	CO2	L1	3M
5.	What is the effect of speed of a generator on its frequency?	CO3	L1	2M
6.	Draw equivalent model of turbine	CO3	L2	3M
7.	Why should the system frequency be maintained constant?	CO4	L1	2M
8.	What are the basic requirements needed for control strategy in LFC system.	CO4	L1	3M
9.	What are the advantages of Shunt capacitor?	CO5	L1	2M
10.	What are the specifications of load compensation?	CO5	L1	3M

Section B (Essay Questions)
Answer all questions, each question carries equal marks. (5 X 10M = 50M)

			Course Outcome	B.T Level	Marks
11.	A)	Develop the condition of economic operation of a power system with transmission line loss not being considered.	CO1	L3	10M

OR

			Course Outcome	B.T Level	Marks
	B)	The fuel inputs per hour of two plants are given as	CO1	L3	10M

$$F_1 = 0.2P_1^2 + 40P_1 + 120 \; Rs/hr$$
$$F_2 = 0.25P_2^2 + 30P_2 + 150 \; Rs/hr$$

Determine the economic operating schedule and the corresponding cost of generation if the maximum and minimum loading on each unit is 100 MW and 25 MW, the demand is 180 MW and transmission losses are neglected. If the load is equally shared by both the units, determine the saving obtained by loading the units as per equal incremental production cost.

			Course Outcome	B.T Level	Marks
12.	A)	What is hydrothermal scheduling? Solve analytically the short-term hydrothermal scheduling problem.	CO2	L3	10M

OR

			Course Outcome	B.T Level	Marks
	B)	Explain the short term hydrothermal economic load scheduling problem by deriving coordination equations.	CO2	L2	10M

			Course Outcome	B.T Level	Marks
13.	A)	Explain the functioning of speed governing system and obtain its necessary mathematical modelling with neat diagram.	CO3	L2	10M

OR

			Course Outcome	B.T Level	Marks
	B)	Develop the transfer function and block diagram representation of First order turbine and generator models.	CO3	L3	10M

14. A)	Explain the dynamic response of an isolated area for load frequency control with first order approximation.	CO4	L2	10M
	OR			
B)	For a single area system show that the static error in frequency can be reduced to zero for single area load frequency control with integral control.	CO4	L3	10M
15. A)	What is series compensation? Explain the advantages of series compensation.	CO5	L3	10M
	OR			
B)	Discuss the operation of uncompensated and compensated transmission lines.	CO5	L3	10M